OUR BOOK SHELF

Vestiges of the Molten Globe. By W. L. Green, Minister of Foreign Affairs to the King of the Sandwich Islands. (Stanford and Co., 1875.)

It is a pity that books of this sort are published, as they can do no good. It is one of that class which attempts to account for the general features of the earth by some extravagant hypothesis, for the proof of which some superficial observations of well-known facts and some show of quotations from well-known writers are all that is offered. Who besides the author can believe that the shape of the earth, deprived of its oceans, would be a tetrahedron, the four angles representing the four continents? Yet the author announces himself as following in the footsteps of Elie de Beaumont in his theory of the *réseau pentagonal*, as the following lucid sentence on page 2 shows :—"The form (of the earth) is included in his *réseau triangulaire*, and is, as I propose to show, the six-faced tetrahedron; the easterly sag or twist of the southern hemisphere on a twin plane, the apparently macled form of the crystal, having caused the lines of relief and depression of the earth's surface to elude solution whilst the *réseau* of that crystal in its simple form alone was applied to them." We quite agree with the author that "only the imperfection of the ideas or of the language in which they are conveyed can prevent the following pages being intelligible to every reader." However untenable De Beaumont's theory was, it was conscientiously and laboriously worked out, and the conclusions were commensurate with the offered proof, even if they were erroneous; but Mr. Green, who would be his follower and improver, jumps to conclusions far wider on the basis of supposition only. The present short volume is only the first part of three that are promised on the figure of the earth, volcanic action, and physiography; and we must hope that the second part, at least, which is to contain "observations of the great active volcanoes and the great extinct volcanic range of the Hawaiian group," which the author must have had good opportunities of making, will be somewhat more solid than this first. Mr. Green is plainly capable of better things than wild speculation, which anyone can make and no one can prove. There are no doubt many remarkable features in the distribution and shape of land and the direction of its coast lines, some of which are here pointed out; but the meaning of these things will only be arrived at by a wider knowledge of facts and sober induction from them. The large map that accompanies the volume shows some of these features well, and is beautifully executed.

Stanford's Elementary Atlases. I. Physical Atlas (sixth edition); II. Outline Atlas; III. Projection Atlas; IV. Blank Sheets for Maps. By the Rev. J. P. Faunthorpe, M.A., F.R.G.S. (London: Edward Stanford, 1875.)

This is really an admirable apparatus, not merely for the purpose of teaching the construction of maps, but for the giving of a real knowledge of what Physical Geography means, and for the conveyance of an impressive idea of the prominent physical features of the particular countries embraced in the set of maps. There are sixteen maps altogether, and in the Physical Atlas the chief physical features of the various countries are clearly brought out—mountain ranges, table-lands, and river-courses. The mountain ranges are simply but sufficiently indicated by thick lines, the principal summits being shown by small circles; the table-lands are shown by simple shading. Besides these features, each map contains one or more of the principal cross-sections of the country, which convey a vivid idea of its conformation. Prefixed to the Physical Atlas are a few useful hints on Map-drawing, on Mercator's Projection, on the Shape and Position of the Land Masses, and a few notes illustrating each map. Atlases II., III., and IV. are intended to lead the student gradually to skill in map-drawing, and are well calculated to serve the purpose. Anyone who goes faithfully through the course indicated by this excellent set of books will have a more real knowledge of the main features of the land-masses of the globe than any amount of mere reading can give. The fact that the Physical Atlas has reached a sixth edition, which contains several new maps and additional letterpress, proves that Mr. Faunthorpe's design has been appreciated.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*]

The Meteors of November 14

The writer some time since called attention to the fact that the dates of certain meteoric showers, given by Humboldt and Quetelet as belonging to the November stream, indicated the existence of two distinct and widely separated clusters moving in orbits very nearly identical. The years thus designated were 1787, 1818, 1820, 1822, 1823, 1841, and 1846. As the last two were subsequent to the great display of 1833, the meteors seen were noticed only in consequence of their being specially looked for; and as the number conformable to the radiant of the Leonids is not given, there may be some doubt whether those observed really belonged to the November stream. The former displays occurred before the periodicity of such phenomena had been suspected, and the number of meteors would seem to have been considerable. As the shower of 1787 preceded by twelve years the great meteoric fall witnessed in South America by Humboldt, the group from which it was derived had passed beyond the orbit of Saturn at the time of the latter display. The phenomena of 1818, 1820, 1822, and 1823 indicate that, as in the case of the major group, which passed its descending node between 1865 and 1870, the meteoroids are extended over a considerable arc of their orbit. From November 1787 to the middle of the nodal passage of 1818–1823, is about 33⅓ years—a period nearly the same as that of the principal cluster. These facts alone were regarded by the present writer as giving reasonable probability to the hypothesis of an approximate identity of orbits. In Nature, vol. xi. p. 407, it was shown that the meteor-showers of October 855 and 856 were probably derived from the stream of Leonids, and it is certainly remarkable that the interval from 855 to 1787 is equal to twenty-eight periods of 33·293 years. Again, the shower observed in China, Sept. 28, A.D. 288, making proper allowance for the nodal motion, corresponds to the same epoch; the interval between 288 and 855 containing seventeen periods of 33·35 years. In view of the fact that the shower from this cluster was due between 1851 and 1855, the following extract from the writer's note-book is not without interest :—

"Newark, Delaware, Nov. 13, 1852. . . . On the evening of the 11th, from 7 to 10 o'clock, an aurora borealis of ordinary brilliancy was constantly observed. About midnight the sky became overcast with clouds, thus preventing our watch for meteors which we were about to commence. On the 12th, from about 3 to 9 o'clock A.M., rain fell almost incessantly. About noon the clouds broke away, and the night between the 12th and 13th was quite clear. During six hours—from 10 P.M. to 4 A.M.—constant watch was maintained at four windows, facing north, south, east, and west. From 10 to 1 o'clock the observations were conducted by Prof. Ferris and myself with assistants. At 1 the place of Prof. Ferris was taken by Prof. Porter, who remained, with myself and assistants, till 4. We observed—

From	10h.	to	11h.	... ...	20 meteors.
,,	11	,,	12	... ...	35 ,,
,,	12	,,	1	... ...	40 ,,
,,	1	,,	2	... ...	52 ,,
,,	2	,,	3	... ...	75 ,,
,,	3	,,	4	... ...	59 ,,
		Total		... ...	281

When the meteors were most numerous, near 3 o'clock, the common point of divergence in Leo was distinctly observed."

I may here add, although the fact is not stated in my memoranda, that the conformable meteors, or a majority of them,

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were seen near the radiant, and that they were generally smaller and had shorter tracks than the November meteors observed between 1865 and 1870. The number seen was too small to be called a shower; at the maximum, however, the fall per hour was nearly double that of ordinary nights. In short, I have no doubt that they were Leonids, and think it highly probable that they were derived from a distinct cluster which passed its perihelion in 1787 and 1820. We have therefore nine recorded meteor-falls which indicate the existence of a second cluster of Leonids, viz., those of A.D. 288, 855, 856, 1787, 1818, 1820, 1822, 1823, and 1852. The showers of 855 and 856 may be somewhat doubtful. If derived from the same meteor-cloud as the others, the dates would indicate considerable perturbations either by Uranus or the earth. The displays have been much less conspicuous than those of the major group, and hence the phenomena have been less frequently observed. The period is about 33·33 years, while that of the other swarm, according to Newton, is 33·25 years. Since their separation, therefore, the latter has gained nearly two-thirds of a revolution in their relative motion. The estimates which have been made in regard to the recent entrance of the cluster into the planetary system must consequently be rejected. DANIEL KIRKWOOD

Bloomington, Indiana, U.S.A., April 20

Systems of Consanguinity

IN NATURE, vol. xi. p. 401, I find a notice of the third edition of Sir John Lubbock's valuable work on the "Origin of Civilisation," in which the following paragraph occurs:—"The facts with which he deals in this chapter [a new one in that volume] have been taken from the voluminous work of the American author, Mr. Morgan; but Sir John Lubbock, putting aside Mr. Morgan's theorising, has submitted a view of them of his own. This, in the main, and as far as it goes, we think, he has made out."

In the same article the following paragraph also occurs:—"One of Mr. Morgan's theories (for he has, or seems to have, two which it is no business of ours to reconcile with each other) is, that these systems are, to use the words of Sir John Lubbock, 'arbitrary, artificial, and intentional.'"

These statements, to the last of which with your permission I desire to reply, present the "American author" both harshly and unfairly to the British public. The interpretation of these systems of consanguinity, thus ascribed to me, is not mine; neither is the interpretation given in my work on "Systems of Consanguinity."

There are three or four places, and perhaps more, in that volume in which I speak of the system of a particular people as "artificial and complicated," and as "arbitrary and artificial," without the qualification in each case which should, perhaps, have been inserted. Thus, commenting on the same system (Con. p. 392), I remark that "the chain of consanguinity has been followed with great particularity, that the artificial and complicated character of the system might be exhibited, as well as the rigorous precision with which its minute details are adjusted." One who had read my work through could not have been misled by this statement, which was intended to characterise this system as it appeared on its face, and apart from all considerations respecting its origin. On the next page but one (p. 394) the same statement is repeated and qualified as follows: "As a plan of consanguinity it [the same system] is stupendous in form and complicated in its details; and seemingly arbitrary and artificial in its character when judged by ordinary standards."

In a single and final chapter of that work (pp. 467-510), entitled "General Results," I discussed the three great systems of consanguinity found in the principal families of mankind, and indicated some of the general conditions they seemed to warrant. My interpretation of these systems will there be found. To this chapter a person would naturally turn if he wished to know the views of the author on the precise question whether the systems were to be regarded as artificial or natural. Among other things, it contains what is prudently called a "conjectural solution" of the origin of the Malayan system of consanguinity, and also a similar solution of the origin of the Turanian system. These solutions are presented and discussed in connection with a series of fifteen prominent institutions and customs of mankind, articulated in a sequence in the order of their probable origination. It commences with "I. Promiscuous Intercourse"; "II. Intermarriage, or Cohabitation of Brothers and Sisters;" and ends with "XV. The Overthrow of the Classificatory System of Relationship, and the Substitution of the Descriptive." In it are enumerated several successive forms of marriage, several successive forms of the family, and the three systems of consanguinity in their order of relation. It was designed to illustrate the course of human progress from savagery to civilisation; one form of marriage being followed by another, one form of the family by another, and one system of consanguinity by another. It is a sequence of human progress through the slow accumulations of experimental knowledge.

At the end of the solution of the origin of the Malayan system, which is founded upon the assumed intermarriage of brothers and sisters in a group (the second member of the sequence), occurs the following statement (p. 482):—"Every blood relationship under the Malayan system is thus explained from the nature of descents, and is seen to be the one actually existing, as near as the parentage of individuals could be known. The system, therefore, follows the flow of the blood, instead of thwarting or diverting its currents. It is a natural rather than an arbitrary and artificial system." The reader will notice that it was this form of marriage which created the Malayan system.

Again, at the end of the solution of the origin of the Turanian system, and after showing that the latter was derived from the Malayan, occurs the following statement (p. 486): "If the progressive conditions of society during the ages of barbarism, from which this solution is drawn, are partly hypothetical, the system itself, as thus explained, is found to be simple and natural instead of an arbitrary and artificial creation of human intelligence."

In prosecuting this investigation one of the questions to be determined was whether these systems were artificial or natural. If the former, they are without ethnological value; but if natural systems, showing the relationships which actually existed when they were respectively formed, then they would possess immense value, because they concerned and demonstrated a condition of ancient society of which previously we had no definite conception. From each system, in such a case, can be deduced, with almost unerring certainty, the form of marriage and of the family in which it originated. It was by this course of reasoning that I discovered the necessary antecedent existence of the intermarriage of brothers and sisters in a group to account for the existence of the Malayan system of consanguinity. This fact gives us the starting-point in which ancient society commences, with the proof that it did so commence. Hence the second member of the sequence above-named. This sequence on its face, and these solutions in express terms, treat these systems as natural in every respect.

In an address before the London Anthropological Institute in 1871 upon the contents of the same volume on Consanguinity, Sir John Lubbock places me in the same position, and leaves me there. He remarks in that address (Journal of A. I., 1871, p. 6), which I presume forms the basis of "the new chapter," that "Mr. Morgan, from several passages, appears to regard the system as arbitrary, artificial, and intentional;" from which he takes occasion to dissent. I find in that somewhat elaborate address no reference whatever to the solutions named, and none whatever to the sequence. I am persuaded they must have escaped his notice. LEWIS H. MORGAN

Rochester, New York, April 19

The Migration of Species

IT has probably been the experience of most who have undertaken a voyage to sea, to have observed land-birds and insects far from the nearest coast, either in course of transit or resting on the vessel. Many travellers have observed these visitants, and their records have proved valuable biological facts bearing on the occasional migrations of species and their consequences as has been pointed out by Mr. Darwin. But it is more than probable that this dispersal of land species over extremely wide areas of sea is far more constant and less occasional than we are at present justified in affirming from the facts as yet collected. Unfortunately, however, we glean very little biological information from the great mercantile marine service of this country, an assemblage of which we are so justly proud, and it is only by costly Government expeditions that we become acquainted with facts that remained and would have remained unnoticed by the immense number of sailors who leave our shores. Nor can we feel surprised at the result when we recollect that biology is scarcely a subject thought necessary to form part of a mariner's education. A good instance is afforded by the results of the voyage of the *Beagle*. An impalpable powder fell upon the ship off the Cape de Verd Islands. This powder must have fallen upon many ships before; but Mr. Darwin being on board the

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